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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,015	03/12/2001	Oleg A. Voronov	99-04US	8121

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EXAMINER

LISH, PETER J

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 07/03/2003.

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/787,015

Applicant(s)

VORONOV ET AL.

Examiner

Peter J Lish

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,10,16,17,19 and 20 is/are rejected.
- 7) ☒ Claim(s) 3,9,11-15 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection. Regarding the argument with respect to claims 6, 7, and 16, the possible use of the material does not provide a limitation on the material itself.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-8, 10, 16-17, 19, and 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Blank et al. ("Phase transformations in solid C60 at high-pressure-high-temperature...") with reference to Hirai et al. ("Changes in structure and electronic state...").

Blank et al. teaches a carbon material having a hardness between 40 and 70 GPa (page 155, column 1). Blank et al., do not specifically teach the density of these materials, however, it is expected that the density of the materials is greater than 2.3 g/cm³ because no difference is seen between the process of forming the material of Blank et al. and that of the instantly claimed invention.

Blank et al. teach a process wherein a fullerene powder is treated at a pressure between 6.5 and 13 GPa and a temperature between 300 and 2100 K (27 and 1827 °C).

Art Unit: 1754

The starting fullerene powder consists of 99.8% C₆₀ and 0.1% C₇₀ (or 99.9% fullerenes). The time of heating under pressure is 60 seconds (page 150, column 1). While Blank et al. do not specifically teach that the powder is agglomerated to a density above 1.4 g/cm³, it is expected that the powder is agglomerated to a higher density because compression is the first stage in the transition of fullerene to graphite and diamond material, or the transition from sp² to sp³ bonding (see Hirai et al., Figure 4).

Regarding claim 5, the process limitations do not alter the carbon material as claimed in claim 1. Therefore, no difference is seen between the carbon material of claim 1 and that of claim 5. Regarding claims 6 and 20, no difference is seen between these "dopants" which are present in amounts as low as 0.0001% and impurities, such as oxygen, which exist in the fullerene sample, either initially or due to the process, such as from the pressing apparatus.

Regarding claims 17, 19, and 20, Blank et al. does not explicitly teach the resistivity of the produced fullerene material. It is expected that the resistivity is less than 10 ohms-cm because no difference is seen between the process of forming the material of Blank et al. and that of the instantly claimed invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1754

Claims 1, 2, 4-8, 10, 16-17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blank et al. ("Phase transformations in solid C₆₀ at high-pressure-high-temperature...") in view of Blank et al. (US 6,245,312 B1).

Blank et al. teach a process wherein a fullerene powder is treated at a pressure between 6.5 and 13 GPa and a temperature between 300 and 2100 K (27 and 1827 °C). The starting fullerene powder consists of 99.8% C₆₀ and 0.1% C₇₀ (or 99.9% fullerenes). The time of heating under pressure is 60 seconds (page 150, column 1).

While Blank et al. do not specifically teach that the powder is agglomerated to a density above 1.4 g/cm³, Blank et al., in (US '312), teaches a method for the high-pressure high-temperature treatment of fullerenes wherein the sample is compressed prior to the heat treatment. It would have been obvious to one of ordinary skill at the time of invention to perform the pressure treatment prior to heating under pressure, as is known in the art to initiate the process.

Blank et al. teaches a product carbon material having a hardness between 40 and 70 GPa (page 155, column 1). Blank et al., do not specifically teach the density of these materials, however, it is expected that the density of the materials is greater than 2.3 g/cm³ because no difference is seen between the process of forming the material of Blank et al. and that of the instantly claimed invention.

Regarding claim 5, the process limitations do not alter the carbon material as claimed in claim 1. Therefore, no difference is seen between the carbon material of claim 1 and that of claim 5. Regarding claims 6, 16, and 20, no difference is seen between these "dopants" which are present in amounts as low as 0.0001% and impurities, such as

Art Unit: 1754

oxygen, which exist in the fullerene sample, either initially or due to the process, such as from the pressing apparatus.

Regarding claims 17, 19, and 20, Blank et al. does not explicitly teach the resistivity of the produced fullerene material. It is expected that the resistivity is less than 10 ohms-cm because no difference is seen between the process of forming the material of Blank et al. and that of the instantly claimed invention.

Claims 8, 10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kozlov et al. ("Transformation of C₆₀ fullerenes into a superhard form of carbon at moderate pressure").

Kozlov et al. teach a process for forming carbon material having a hardness of about 4000 kg/mm³, which corresponds to about 39 GPa. The process comprises applying pressure in the range of 2.6-3.0 GPa to a fullerene powder, followed by increasing the temperature up to about 700 °C, and holding the treatment conditions for about 2 hours. While it is not explicitly taught that the powder is agglomerated to a certain density, Kozlov et al. teach that the density of the initial fullerene powder is 1.7 g/cm³. Alternatively, because the powder is brought to the working pressure before it is heated, it is expected that the fullerene powder be agglomerated to a density above 1.4 g/cm³ prior to the treatment.

While the initial purity of the C₆₀ sample is not explicitly taught, it would have been obvious to one of ordinary skill at the time of invention to use a sample having at least 99.9% fullerenes, as doing so will yield a more pure product and prevent side reaction.

Art Unit: 1754

Regarding claim 16, no difference is seen between these “dopants” which are present in amounts as low as 0.0001% and impurities, such as oxygen, which exist in the fullerene sample, either initially or due to the process, such as from the pressing apparatus.

Allowable Subject Matter

Claims 3, 9, 11-15, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 1754

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 703-308-1772.

The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

PL
June 23, 2003



STUART L. HENDRICKSON
PRIMARY EXAMINER